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# AMSAT SATELLITE REPORT



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## **Thermal-Vac Tests** **Yield Mixed Results**

The thermal-vacuum tests of the Phase IIIB spacecraft being conducted at the Goddard Space Flight Center concluded 7 June with generally favorable results. Most of the hardware performed as expected and will not be potted prior to shipment to Germany for the vibration tests. However, two relatively minor problems showed up in the tests which will now require some additional work.

The transmitter portion of the U (Mode B) transponder malfunctioned when apparently an output power transistor failed. Although the failure was a surprise and a precise diagnosis must await a careful analysis, the corrective action was believed to be not overwhelming. Similarly, the receiver in the L-transponder developed a severe case of deafness during the test. The condition appears to be temperature dependent and reproducible and so would appear tractable and easily resolved. Again, we must wait for the failure mode analysis to reveal the precise cause.

The thermal vacuum tests are designed to stress the spacecraft and in fact to precipitate just these types of failures. The malfunctions occurred during temperature excursions when thermal and electrical stresses are presumably greatest. It is the performance of these tests which helps maximize the reliability (availability) of the spacecraft hardware while in orbit. For Phase IIIB, the mean time between failures (MTBF) while in orbit should be not less than about 3 years. Maintenance on the satellite subsequent to launch is deemed somewhat problematic!!

The majority of the hardware withstood the rigors of the thermal vacuum test very well. All parties were generally satisfied with the results despite the minor setbacks with the two transponders. The consensus was that neither malfunction threatened the launch nor did they affect the in-house schedule in any lasting, serious way.

## **Chicken Little Contest On Now!**

In the childrens' story, Chicken Little is the fowl who was tricked into believing the sky was falling by a sly fox who had ill designs on the feathered population of the barnyard. Perhaps you recall the story. Now comes AMSAT with its own Chicken Little tale. This one takes the form of a contest. Sound interesting? Read on!

ISKRA 2 is the newest Russian amateur satellite. Because of its low orbit it will stay in orbit for only a few more weeks. AMSAT is challenging its members and friends to predict as accurately as possible the exact time when it will "fall out of the sky." (Remember Chicken Little's plaintiff cry, "The sky is falling, the sky is falling!") The winner will need some skill and an element of luck since the best computer models available in the world cannot account for the effects of solar activity and thus are hard-pressed to predict the exact decay time to within a day, one week in advance.

So we have insured that the element of chance remains viable in structuring the following sets of rules.

1. The winner is the individual (or group) who most accurately predicts the exact time of decay of the orbit of ISKRA 2. The decay time is defined as the time at which it impacts the earth's surface.

2. You may enter as often and file as many estimates as you wish. One estimate per letter or postcard. Entry must include name, address, callsign (if any), AMSAT membership status and decay estimate in terms of date and time in hours, minutes and seconds all expressed in Coordinated Universal Time (UTC). Entries must be mailed to WA2LQQ, P.O. Box 177, Warwick, NY 10990 and be postmarked not later than seven days before your predicted decay date.



Shep, W4AUZ, left, gives some tips to Doug, KO5I at the Dayton Hamvention.



3. Use of official government resources is expressly prohibited. Computer models published in the open literature may be used if your entry cites the model and the source of the program.

4. The decision of the judges is final. All entries become the property of AMSAT and none can be returned. The winner will be announced within 30 days of confirmation of the decay event. The winner will be notified by mail. No telephone inquiries will be received. In the event of a tie the winner will be determined by a fair lottery drawing.

5. The method of determination of the exact moment of decay shall be determined by an impartial panel of scientists if the decay occurs outside of the range of surveillance radars or other technical means of orbit measurement.

The prize to be offered to the winner was unspecified at presstime but was said to be of tangible worth. ASR has learned that the prize will either be a piece of amateur radio equipment in the less-than \$100 range or similar value in AMSAT goods and services.

The object of the contest is to promote more of the technical challenge of amateur space activities in the spirit of radiosport and to emphasize the fundamental physics on which much of our area of interest is based. Good luck to all!

## **ISKRA 2 Eyeball QSO: ZS1BI Spots The Spark!**

Astronomer Greg Roberts, ZS1BI, reports that ISKRA 2, the Russian word for spark and the newest Amateur Radio satellite, was spotted on a recent pass over his observatory in South Africa. The satellite was launched at about 328 km (204 miles) on 17 May when it was deployed through the hatch of the Salyut 7 spacecraft by the two cosmonauts aboard. Greg reports that the ISKRA 2 appeared to have a magnitude of about 7.5. That is about four times dimmer than normally can be seen with the unaided eye. Each magnitude step represents a change in brightness of  $2\frac{1}{2}$  times (2.512 to be more precise). A 5th magnitude star is the dimmest one can see normally while the brightest stars have magnitudes of 2, 1 or even -1. Sirius, the brightest star is -1.44 while Mizar, the second "star" in the Big Dipper's handle is actually a binary (double) comprising a 2nd and a 5th magnitude pair.

The modest instrument Greg used had an objective lens of about 63 mm ( $2\frac{1}{2}$ " ) and a field of view of about 8 degrees. ISKRA 2 appeared to be spinning "because," according to ZS1BI, "of the rapid fluctuations in brightness which usually indicates a spinning object."

ZS1BI has been doing this for years and is probably the best there is at watching these elusive points of light flit across one's field of view just after dusk or just before dawn. Meanwhile, a frustrated amateur fraternity awaited some indication regarding the possible future of the newest sputnik, ISKRA 2. The normally productive news sources have been sadly silent with respect to ISKRA; a sign that perhaps there is little hope held out for the short-lived bird to be turned on. A wait-and-see



**The AMSAT booth at Dayton.**

posture was apparent in most veteran OSCAR users. Many pointed to the 24th of June special events stations (see related story elsewhere) as offering a suitable "occasion" for transponder activation if the technical difficulties earlier surmised to have delayed the turn-on turn out to be false or cured.

Dozens of low-flying satellites can be seen in the evenings and before dawn with the naked eye. Many are in low (150 km) polar orbits and are magnitude 1 or 2 making for easy spotting.

## **RS Bulletin Board Carry News**

The Bulletin Board (codestore) feature aboard RS-5 and 7 have seen a high level of activity lately carrying messages of interest to the world's amateur satellite user community. Two recent messages copied are the following:

"VVV VURNAL RADIO PROWODIT O — — — • NOZAD — — — • NYE QSO VIA SPUTNIKI 24 DO 28 I •• — — NK • — • — IZ. UP2 PSE QRV SURE QSL AR AR AR"

[Ed. Note: Certain symbols in Russian, e.g., — — — • which is pronounced ch, have no equivalent in International Morse which most hams use.]

The above roughly translates to:

"Radio Magazine is conducting a QSO party. QSO via RS 24 until 28 June from UP [Lithuania] Please be ready 100% QSL guaranteed"

More recently the following announcement was copied from the Bulletin Board in English:

"SPECIAL CALLS WL BE ON 24 TO 28 JUNE VIA SPUTNIKS R2PED R2PEK R2PEH R2PEZ R2PCX R2PCR"

There were no special instructions associated with the latter message. The 24th of June may be significant in that it is the currently planned date for the launch of the second crew of Salyut 7 joining the two man crew already on-station. The new crew will include a French Cosmonaut and a Russian.

Thanks to W4KM, W0CA, K2ZRO and others for their reports/translations.



## **Spacecraft-Sitters Acknowledged**

While the Phase IIIB spacecraft was undergoing thermal-vacuum tests recently at the Goddard Space Flight Center in Greenbelt, Maryland, a number of AMSAT members stood-by to monitor the performance of the spacecraft. On behalf of AMSAT, ASR gratefully acknowledges the assistance in this connection of the following individuals: W3OTC, W3OZ, WA4SIR, KB4ZC, W4PUJ, W9GC, W4OWA, KA4VVG, W3PK, WA3VZW, K3PNL, W3XO and K8SYH. VY TKS ALL.

## **Ariane Launch Schedule**

The European Space Agency recently announced its plans for recovering from the costly delay experienced in connection with the failure in orbit of the MARECS A spacecraft (as reported recently in these pages). The schedule calls for a very tight (some believe overly optimistic) schedule beginning with the September 82 launch of L5, the first operational mission. L5 is due for launch on 10 Sept. and will carry the MARECS B and Sirio 2 satellites. L6, with Exosat aboard, is scheduled for November and L7, carrying ECS 1 and AMSAT Phase IIIB, is nominally on tap for January 83. AMSAT officials, who would not be quoted by name, cautioned, however, that based on historical precedents, the January date was "inordinately optimistic and not one that bears a high confidence if historical precedents are indicative. February or March are more realistic it would seem."

Following L7 are L8 and L9 both with Intelsat missions aboard and nominally scheduled for March and May 1983, respectively.

## **UoSAT Salvage Mission Continues**

Efforts to salvage the UoSAT-OSCAR 9 mission by shutting off one of the telemetry beacons continue with Dave Olean, K1WHS, the main hope now that a breakthrough may occur. As reported, UoSAT got into serious trouble several weeks ago when, through a tragic series of human errors, the command software safeguards were overridden and UoSAT's two beacons were simultaneously activated. Under these circumstances the 2-meter command receiver is desensed by the 2-meter telemetry beacon and the 70-cm command receiver similarly is desensed by the 70-telemetry beacon. The current effort aims to apply sufficient rf energy at the 2-meter command frequency such that the desense problem is overcome. To make matters worse, there apparently exists a timing complication which, in effect, makes the execution of a properly formatted command uncertain. That is, the situation is akin to a pulse coincidence problem where the desired result is attained only upon coincidence of two narrow, unsynchronized pulses. (This explanation is designed to be emblematic of the actual, somewhat more complex, problem itself.) Thus the resolution of the problem requires a twofold solution: 1) Present the command receiver with sufficient rf to overcome the desense from the local beacon and, 2) Do it often enough that one has a

reasonably favorable statistical chance of realizing a pulse coincidence. Enter K1WHS. Dave has received a command unit from G3YJO at the University of Surrey and will be attempting to command UO-9 at every opportunity. This will greatly improve the odds of success just as the more one plays the roulette wheel, the higher is the likelihood that one's number will finally come up. (Fortunately, the cost of "chips" in this high-stakes game is the cost of Dave's electricity plus the wear and tear on his rig...and his sleeping habits. UoSAT is visible during normal work hours and normal sleep hours. On second thought, Dave, an inveterate EME folk has an XYL who must by now be acclimated to some rather bizarre sleep habits!)

G3YJO's calculations show that K1WHS's 2-meter signal should be received by the UoSAT command receiver with sufficient margin for a good chance of getting the command sequence in. Given sufficient time, AMSAT is told, the resolution of this continuing dilemma will be at hand. Unfortunately, much of the enthusiasm for the project has worn thin in the presence of a protracted test period followed by the present disaster. The feeling perceived by ASR is one of disappointment permuted to frustration evolving to apathy. Alas, here cracks a noble heart!

## **Net Changes Told**

AMSAT Net Manager Wray Dudley, W8GQW, working in concert with other senior AMSAT officials has begun a series of transitional moves which will eventually see the International Net find a new home and its major outlet on the new Phase IIIB satellite. The following will summarize some of the changes that are already under way and preview some additional ones that are in the planning stages at present.

The International Nets have held forth on Sundays at 1800 UTC and 1900 UTC for nearly a decade. Problems of increased QRM, more contest activity and a deteriorating civility have made the 20 and 15 meter nets more a trial of patience and endurance than the service to the members it had been. In an effort to spread the workload, several new stations have taken up the task. These include KO5I and KEØT as well as W8GQW. WA2LQQ has asked for and received relief from the nets but will continue as a backup station. With the geographical diversity of the new stations, receivers of the bulletins are often unsure if the net is on because some cannot hear the bulletins. Moreover, since the new stations are more centrally located than the prior stations, the format of the net has been changing to accommodate the different beam headings. In short, with the new crew on duty now, we are faced with a new set of unpleasant circumstances. In addition we still have the same QRM problems. What we have gained, however, is the security of having the NCS staff several men deep, that is we now have reserves for emergencies.

To be sure, there still are no easy solutions. However, in recognition of both the major mission of the Nets and the desires of the listeners, AMSAT is modifying the protocol for the 20 and 15 meter International Nets as follows. The nets will proceed according to a five tier



priority system. The determining factor as regards how much lower level activity occurs will be the *time available*. Priority 1: The Net will proceed on time. It is paramount that listeners know when and where to listen for the nets. If necessary, all lower priority activities will be truncated to accomplish priority 1. Priority 2: Outgoing bulletin traffic takes precedence over other activities. Priority 3: Incoming traffic takes precedence over lower priority activities. Priority 4: Routine Net check-ins (without traffic) will be accommodated on a basis of "as time allows." Priority 5: Any other activities deemed appropriate by the NCS.

In another net domain, it has been suggested by a number of AMSAT members that a good way for AMSAT to spread the word, that is, to germinate the seed of interest in satellites in the soil of the general amateur radio community, is to retransmit the hf nets on vhf frequencies. W6SP suggested that the low end of 2 meters where, in the U.S., some of the more technically inclined amateurs are known to converge, and where ssb is the rule. John suggests that these are fertile grounds. His experience in retransmitting the Nets on 144.144 MHz ssb to the Los Angeles basin indicates the profitability of this scheme. On the other hand, W3IWI suggests that retransmission through a friendly repeater might be a very effective means for accomplishing our present objectives. Tom points out that many would-be satellite users do not own all-mode 2 meter rigs and thus would be denied the opportunity we all believe they deserve to have a free and available exposure to our generally acknowledged superior net program. Tom does further emphasize the need to identify a FRIENDLY repeater such as the Goddard Repeater in Maryland. If the repeater has a less than enthusiastic attitude towards AMSAT, the potential for grief and damage to our cause far outweighs any potential benefits. Extreme caution and a hearty dose of good judgement are certainly in order here. If in doubt, don't!

With the retirement of WA2LQQ from regular net duty on Sundays, Net Manager W8GQW makes the following announcement.

"The AMSAT International Sunday net operations team is seeking two additional members to assist with this popular membership service on 20 and 15 meters. As AMSAT President, Tom Clark stated in his 1981 year-end report to the members, "AMSAT's hf nets serve as our primary communications element in the field organization."

KE0T, KO5I and W8GQW, now handling the Sunday nets on a rotating basis, would particularly like to have two more members on the team who are not now involved in serving AMSAT in an active role. In other words if you have been "standing by" here is an opportunity to play an important part for the organization on a once-a-month duty. You will find this activity to be most interesting, educational and personally satisfying, while at the same time serving your fellow members. A superstation is not required. A reasonable power input to an

amplifier and a good tri-band beam will do the job nicely. From a geographical location standpoint you probably should live in the Eastern one-third of the U.S. or Canada. This will enable most consistent signals to our associates overseas on 15 meters and excellent coverage of the Western two-thirds of the U.S. and Canada on 15 and 20 meters. So those of you in VE1, VE2, VE3 land and members in the U.S. 1, 2, 3 and 4 call areas are prime possibilities.

There are exciting times ahead with AMSAT, so join the team and help make it happen. Drop a note to AMSAT, P.O. Box 27, Washington, DC 20044, to the attention of any one of the following: K1HTV, Rich Zwirko, AMSAT V.P. Operations, WA2LQQ, Vern Riportella, AMSAT Executive V.P. or W8GQW, Wray Dudley, AMSAT Net Manager."

The planning for use of the Phase IIIB satellite for Bulletin transmission is now entering a critical stage and all members are requested to consider and recommend how this incredibly potent new resource might best be used to disseminate the bulletins. Some of the new problems to be encountered and planned around are challenging. For example, since Phase IIIB will not be sun-synchronous, it will not appear at the same local time each day. This means that net times will have to vary considerably. Moreover, coverage areas will vary as well. How shall we schedule the nets to minimize the confusion factor here? Should the net times stay fixed and the day of the week vary? Or should the day be fixed and the time vary? How about a mixture? And so on.

## **Satellite WAS List Burgeons In Hawaiian-Arkansas Wake**

The list of recent Satellite endorsements to the coveted WAS award is growing almost daily. The combination of the high-flying RS birds and the renewed activity they have spurred has resulted in a swelling of the ranks much to the delight of many who thought the age of satellite awards was to be eclipsed by the new, Phase III class of satellites. Rulings by ARRL and recommendations by AMSAT prohibit certain awards (such as DXCC) when the QSOs take place on the very high, elliptical orbit satellites such as Phase IIIB.

Both W9KDR/1 and K5DHU garnered their WAS awards by working Hawaii. Bernie, W9KDR/1, ARRL's satellite coordinator, is especially proud of his award as he is only the 5th New England station to have accomplished the feat. [Ed. Note: Late report that W8TN, WV Area Coordinator has just made his 50th, too.]

Meanwhile, the Arkansas DXpedition led by KO5I over the Memorial Day weekend provided number 50 for WD4FAB, WB4ZXS and K0CY. The DXpedition comprised, (besides KO5I) WB5ROR, WB5TNC plus two non-ham helpers. The log count totaled 29 satellite contacts; 8 on "J" and 21 on "A." Doug says that the RS birds were super for this activity. Congratulations to all!